

Remarks/Arguments

Applicants respectfully request favorable reconsideration of the subject application, particularly in view of the above amendment and the following remarks. There is no additional fee for the above amendment as the number of independent claims and the total number of claims have been reduced.

Claims 1-18, all of which have been rejected, are pending in the subject application.

Applicants have amended Claim 7 of the subject application by incorporating the limitation of the disposition of a measurement system within the transmitter, which measurement system comprises a metallic section in direct contact with the direct metallic contact between the transmitter and the metallic pipe and/or metallic rod. Claim 7 has further been amended to require that the toroid of the transmitter is circumferentially disposed around at least a portion of the metallic section of the measurement system. These amendments are fully supported, for example, in paragraph [0033] of the description and in Fig. 4 of the application, which shows disposition of the measurement system within the transmitter and direct contact between a portion of the metallic section thereof (in the form of metallic core 35) and the direct metallic contact between the transmitter and the metallic pipe and/or metallic rod, as originally filed. Accordingly, Applicants respectfully urge that this

amendment is fully supported by the application as originally filed and incorporates no impermissible new subject matter into the subject application.

In addition to the amendments to Claim 7 described herein above, Claim 8 has been canceled due to incorporation of subject matter recited therein being incorporated into Claim 7 and Claim 10 has been amended to depend from Claim 7 in view of the cancellation of Claim 8 from which Claim 10 originally depended. Finally, Claims 11-18 have been canceled from the subject application.

The invention claimed by Applicants is an apparatus for retrieving operational data from a subterranean borehole. More particularly, the invention claimed by Applicants is a method and apparatus for providing a radio frequency data link between a subterranean device disposed proximate the end of a drill string, whereby data related to activity at the end of the drill string can be communicated in real time to the drill rig operator. The apparatus comprises a drill string having a working end comprising drilling means for drilling a subterranean borehole and/or pullback means for pulling an object through a subterranean hole, a measurement system comprising a metallic section in direct contact with the drill string, at least one toroid circumferentially disposed around a first portion of the metallic section and having toroidal electrically conductive windings, and a non-conductive material disposed around the toroid whereby contact between the toroid and the subterranean

environment during operation of the apparatus is precluded. Applicants respectfully urge that the prior art relied upon by the Examiner as the basis for rejection of the subject application neither teaches nor suggests such an apparatus as claimed by Applicants.

Claims 1, 2 and 4-6 have been rejected under 35 U.S.C. 102(b) as being anticipated by Silverman et al., U.S. Patent 2,354,887 (hereinafter “the Silverman et al. patent”). This rejection is respectfully traversed. The Silverman et al. patent teaches a well signaling system comprising a drill string 13 having a core 18 of ferromagnetic material enclosing the drill string proximate the drilling end of the drill string. A coil of insulated wire 19 is wound around the core. Two ends of the coil of insulated wire 19 are connected to leads which are brought into a chamber 20 in the drill string itself, in which chamber these leads are connected to either an electrical generating apparatus or a control apparatus, which the Examiner asserts corresponds to the measurement system of Applicants’ claimed invention (Col.2, lines 21-52; Fig. 2). Applicants note that the Examiner has indicated the measurement systems of the Silverman et al. patent as being shown in Figs. 3 and 4 thereof, which correspond to the device shown in Fig. 2 as being in chamber 20. As clearly shown in Fig. 2, *the electrical generating apparatus or control apparatus (measurement system) to which the two ends of the coil are connected is disposed in a chamber*, and, also as clearly

shown, *the electrical generating apparatus or control apparatus is not circumferentially enclosed by the core 18*. In addition, by virtue of its being disposed in a chamber formed by the drill string, the electrical generating apparatus or control apparatus has *no metallic section in direct contact with the drill string*. Applicants note that the only connections with the electrical generating apparatus or control apparatus of the Silverman et al. patent are the aforementioned leads with the ends of the insulating coil 19 and with electrodes 28 and 29 disposed in the surface of insulation 27 (Col. 3, lines 31-41). In contrast thereto, Claim 1 of the subject application requires a measurement system having a metallic section in direct contact with the drill string and further requires a toroid circumferentially disposed around a first portion of the metallic section of the measurement system. This arrangement is clearly shown, for example, in Fig. 4 of the subject application.

The Examiner has argued that Fig. 2 of the Silverman et al. patent shows all of the elements of the rejected claims. In particular, the Examiner has identified the top half of the figure as the first portion of a metallic section of a measurement system and the bottom half as the second portion of a metallic section of a measurement system, both of which are in direct contact with the drill string 13. The Examiner has further identified the toroid 18 as being circumferentially disposed around the first portion of the metallic section of the measurement system. Applicants

respectfully disagree with this characterizations of the teachings of the Silverman et al. patent.

The Silverman et al. patent identifies element 13 as a drill string and indicates that core 18 encloses the drill string (Col. 2, lines 34-37). The invention claimed by Applicants comprises a measurement system comprising a metallic section. The Examiner has also identified the elements shown in Figs. 3 and 4 as corresponding to the measurement system of Applicants' claimed invention. Applicants note that these elements are disposed within the chamber 20 shown in Fig. 2 of the Silverman et al. patent. Applicants respectfully urge, however, that those elements shown in the Silverman et al. patent and identified by the Examiner as corresponding to the measurement system of Applicants' claimed invention have no metallic sections in direct contact with the drill string as required by Applicants' claimed invention, because there is no actual connection between the "measurement system" and the drill string. Accordingly, Applicants' urge that *the portions of the drill string identified by the Examiner as constituting metallic sections of a measurement system are not connected with the measurement system and, thus, are not metallic sections of the measurement system, but, in fact, are merely parts of the drill string.*

Accordingly, Applicants respectfully urge that the Silverman et al. patent neither teaches nor suggests the apparatus for downhole measurements claimed by Applicants comprising a measurement system having a metallic section in direct contact with the drill string and further comprising a toroid circumferentially disposed around a first portion of the metallic section of the measurement system. Absent these elements, Applicants respectfully urge that the Silverman et al. patent does not anticipate the invention claimed by Applicants in the manner required by 35 U.S.C. 102(b).

Claims 7-9 have been rejected under 35 U.S.C. 102(b) as being anticipated by the Silverman et al. patent. This rejection is respectfully traversed. Applicants' arguments with respect to the Silverman et al. patent as set forth herein above are equally applicable to this rejection and, thus, will not be repeated. Independent Claim 7 recites an apparatus comprising a metallic pipe and/or metallic rod (i.e. drill string), a transmitter having at least one direct metallic contact with the metallic pipe and/or metallic rod, a measurement system suitable for measuring at least one operational characteristic associated with the drill string disposed within the transmitter, which measurement system comprises a metallic section in direct contact with the at least one direct metallic contact of the transmitter with the metallic pipe and/or metallic rod, the transmitter comprising a toroid disposed circumferentially

around at least a portion of the metallic section and having toroidal electrically conductive windings, and at least one non-conductive material disposed around the toroid, whereby contact between the toroid and an environment surrounding the transmitter is precluded. Thus, *one of the requirements of the transmitter of Applicants' claimed invention is the disposition therein of a measurement system having a metallic section in direct contact with the direct metallic contact between the transmitter and the metallic pipe and/or metallic rod.* As previously indicated, the Examiner has identified the electrical circuits shown in Figs. 3 and 4 of the Silverman et al. patent as corresponding to the measurement system of Applicants' claimed invention. Also, as previously indicated, there is no direct metallic contact between a metallic section of the measurement system and the drill string of the device of the Silverman et al. patent as required by Applicants' claimed invention. In addition, the toroid of the Silverman et al. patent is not disposed around at least a portion of the metallic section of the measurement system as required by Applicants' claimed invention. Accordingly, absent these elements, Applicants respectfully urge that the Silverman et al. patent does not anticipate the invention claimed by Applicants in the manner required by 35 U.S.C. 102(b).

Claims 11-13 have been rejected under 35 U.S.C. 102(b) as being anticipated by the Silverman et al. patent. Applicants respectfully urge that this

rejection is rendered moot as a result of the cancellation of Claims 11-13 from the subject application.

Claims 14-17 have been rejected under 35 U.S.C. 102(b) as being anticipated by the Silverman et al. patent. Applicants respectfully urge that this rejection is rendered moot as a result of the cancellation of Claims 14-17 from the subject application.

Claims 3 and 10 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Silverman et al. patent as applied to Claims 1 and 7, and further in view of Dublin, Jr., U.S. Patent 6,068,394 (hereinafter “the Dublin, Jr. patent”). This rejection is respectfully traversed. Applicants arguments with respect to the Silverman et al. patent are equally applicable to this rejection and, thus, will not be repeated other than to reiterate that *the Silverman et al. patent neither teaches nor suggests the apparatus for downhole measurements claimed by Applicants comprising a measurement system having a metallic section in direct contact with the drill string and further comprising a toroid circumferentially disposed around a first portion of the metallic section of the measurement system.* The Dublin, Jr. patent teaches a method and apparatus for providing data dynamically during the drilling of a borehole. The apparatus is incorporated within the drill string and includes a downhole element consisting of a subsection which includes stressed diaphragms that

act as collectors for discrete strains generated by nominally squared discontinuities. Strain gauges affixed to one or more of these diaphragms provide output signals proportional to stress from which various force components can be uniquely determined. The Dublin, Jr. patent is relied upon by the Examiner as teaching an apparatus for measuring tension during the drilling of a subterranean borehole, based upon which the Examiner argues that it would have been obvious to one of ordinary skill in the art to employ a “resistive” type sensor, such as a strain gauge, in the apparatus of the Silverman et al. patent to arrive at the invention claimed by Applicants. Applicants respectfully urge, however, that application of the teachings of the Dublin, Jr. patent to the apparatus of the Silverman et al. patent would not result in the invention claimed by Applicants, because neither the Silverman et al. patent nor the Dublin, Jr. patent teach or suggest an apparatus for downhole measurements comprising a measurement system having a metallic section in direct contact with the drill string and further comprising a toroid circumferentially disposed around a first portion of the metallic section of the measurement system as claimed by Applicants. Accordingly, Applicants respectfully urge that the Silverman et al. patent and the Dublin, Jr. patent, alone or in combination, do not render Applicants’ claimed invention obvious in the manner required by 35 U.S.C. 103(a).

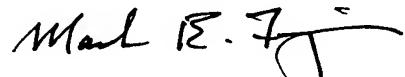
Serial No.: 10/680,540

Conclusion

Applicants intend to be fully responsive to the outstanding Office Action. If the Examiner detects any issue which the Examiner believes Applicants have not addressed in this response, Applicants urge the Examiner to contact the undersigned.

Applicants sincerely believe that this patent application is now in condition for allowance and, thus, respectfully request early allowance.

Respectfully submitted,



Mark E. Fejer
Regis. No. 34,817

Gas Technology Institute
1700 South Mount Prospect Road
Des Plaines, Illinois 60018
TEL (847) 768-0832; FAX (847) 768-0802